REMARKS

Interview with the Examiner

The Applicant's representative wishes to thank the Examiner for the courtesy extended during the Examiner's Interview conducted on May 23, 2005. The subject of the interview consisted primarily of directly claiming the technique of detecting the threshold voltage of the field effect transistor within a pixel. During the interview, it appeared that this direct claiming of the technique would overcome the 35 U.S.C. 103(a) rejections based upon U.S. Application Publication No. US 2001/0045508 to Dierickx ("Dierickx") and U.S. Patent No. 5,289,286 to Nakamura et al. ("Nakamura").

Status Of Application

Claims 1, 2, and 4-39 are pending in the application; the status of the claims is as follows:

Claims 4, 5, 9, 19, 21, and 22 are withdrawn from consideration.

Claims 1, 2, 6, 11, 16, and 25-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura.

Claims 7, 8, and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura and in further view of U.S. Patent No. 6,512,543 B1 to Kuroda et al. ("Kuroda").

Claims 14 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura and in further view of U.S. Patent No. 6,323,479 B1 to Hynecek et al. ("Hynecek").

Claims 10, 12, 13, 15, 17, 18, 20, 23, 24, and 30-39 are allowed.

Claim Amendments

Claims 1 and 25 have been amended to more directly claim the technique of detecting the threshold voltage of the field effect transistor within a pixel. Support for this technique is found in the Specification beginning on page 11, line 20 through page 14, line 7. Thus, these changes do not introduce any new matter.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1, 2, 6, 11, 16, and 25-27 under 35 U.S.C. § 103(a), as being unpatentable over Dierickx in view of Nakamura, is respectfully traversed based on the following.

> Claim 1 includes the limitations of:
>
> a photoelectric conversion portion having a photosensitive element and a field effect transistor configured to produce an electric signal in accordance with amount of incident light and that outputs a signal obtained by converting the electric signal natural-logarithmically;
>
> ...
>
> a controller that detects a variation in sensitivity of the photoelectric conversion portion of each pixel by causing an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor and reading out the electric charge via the lead-out path.

These two limitations relate directly to detecting the threshold voltage of the field effect transistor associated with each photosensitive element, a primary cause of variations in the sensitivity of pixels within an image-sensing apparatus. A discussion of the technique that detects the threshold voltage of the field effect transistor begins on page 11, line 20, and continues through page 14, line 7. Briefly, as illustrated in Figs. 3 and 4A-4C, the controller causes an electric charge to accumulate between the source and drain of the transistor T1, *see page 12, lines 18 and 19.* As the controller subsequently alters the logic

levels of the various clock lines, a voltage proportional to the threshold of the transistor T1 appears at the drain of transistor T1, *see page 13, lines 10-12*. This voltage is applied to the gate of transistor T4, causing a current, proportional to the threshold voltage of transistor T1, to flow through transistor T4 and to accumulate on capacitor C, *see page 13, lines 12-18*. The charge accumulated on capacitor C, which is proportional to the threshold voltage of T1 is subsequently coupled to output line 6 via transistor T5, *see page 13, lines 18-23*. The controller uses this threshold sampling technique for each pixel in an array and stores this as compensation data to correct for threshold voltage variations throughout the array, *see page 13, line 23 through page 14, line 6*.

Dierickx discloses directly injecting current into the pixel cell to generate compensation data. In particular, Figs. 1a and 1b disclose either a constant current source (element 2 in Fig. 1a) or a known supply voltage and a resistance (element 5 in Fig. 1b). As disclosed in paragraph [0027] of Dierickx, this direct, known current is combined with the photocurrent. Therefore, Dierickx does not disclose accumulating an electric charge that is indicative of the threshold voltage of the field effect transistor. In fact, the term "threshold" or "threshold voltage" is not even found within Dierickx. Because Dierickx does not disclose or suggest, "causing an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor," Dierickx cannot anticipate or render obvious claim 1.

The Office Action rejects claim 1 over the combination of Dierickx and Nakamura. As just shown, Dierickx fails to disclose or suggest at least one limitation of claim 1. Nakamura similarly fails to disclose this limitation of claim 1. Nakamura's third embodiment discloses a method for correcting variations in sensitivity by exposing the array of pixels to two different illuminances L and L', *see col. 14, line 37 through col. 15, line 2*. This method of using two different illuminances is clearly not equivalent to "causing an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor." Therefore, Nakamura, like Dierickx, does not disclose or suggest at least one limitation of claim 1. Thus, the combination of Dierickx

and Nakamura fails to disclose or suggest at least one limitation of claim 1, and therefore cannot render obvious the invention of claim 1.

Claims 2, 6, 11, and 16 depend from claim 1. As the combination of Dierickx and Nakamura does not render claim 1 obvious, the combination of Dierickx and Nakamura cannot render claims 2, 6, 11, and 16 obvious for at least the same reasons.

Claim 25 includes the limitations of:

> a photoelectric conversion portion including a photosensitive element and a field effect transistor configured to produce an electric signal in accordance with an amount of incident light;
>
> ...
>
> a controller that detects a variation in sensitivity of the photoelectric conversion portion of each pixel by causing an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor and reading out the electric charge via the lead-out path.

Thus, claim 25, similar to claim 1, includes a combination of a photosensitive element and a field effect transistor along with a controller causing the accumulation of electric charge in a prescribed manner. As discussed above, the combination of Dierickx and Nakamura does not disclose or suggest these limitations and therefore cannot render the invention of claim 25 obvious. Claims 26 and 27 depend from nonobvious claim 25 and are nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 1, 2, 6, 11, 16, and 25-27 under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura, be reconsidered and withdrawn.

The rejection of claims 7, 8, and 28 under 35 U.S.C. § 103(a), as being unpatentable over Dierickx in view of Nakamura and in further view of Kuroda, is respectfully traversed based on the following.

As discussed above, the combination of Dierickx and Nakamura does not disclose or suggest at least the limitation of a controller causing the accumulation of an electric charge in the prescribed manner. Kuroda similarly fails to disclose a controller causing the accumulation of charge in the prescribed manner. In fact, Kuroda, like Dierickx, does not even include the term "threshold" or "threshold voltage." Therefore, the combination of Dierickx, Nakamura, and Kuroda fails to disclose or suggest a controller that causes "an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor." For at least this reason, the combination of Dierickx, Nakamura, and Kuroda cannot render obvious the invention of claim 1. Claims 7 and 8 depend from nonobvious claim 1 and are therefore nonobvious for at least the same reasons.

As discussed above, the combination of Dierickx, Nakamura, and Kuroda fails to disclose or suggest a controller causing the accumulation of an electric charge indicative of the threshold voltage of a field effect transistor. Therefore, the combination of Dierickx, Nakamura, and Kuroda cannot render obvious the invention of claim 25 that includes such a limitation. As claim 28 depends from nonobvious claim 25, claim 28 is nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 7, 8, and 28 under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura and in further view of Kuroda, be reconsidered and withdrawn.

The rejection of claims 14 and 29 under 35 U.S.C. § 103(a), as being unpatentable over Dierickx in view of Nakamura and in further view of Hynecek, is respectfully traversed based on the following.

As discussed above, the combination of Dierickx and Nakamura does not disclose or suggest at least the limitation of a controller causing the accumulation of an electric charge in the prescribed manner. Hynecek similarly fails to disclose a controller causing the accumulation of charge in the prescribed manner. While Hynecek includes the term "threshold voltage," it does not disclose or suggest accumulating an electric charge indicative of the threshold voltage of a field effect transistor. Therefore, the combination of Dierickx, Nakamura, and Hynecek fails to disclose or suggest a controller that causes "an electric charge indicative of the threshold voltage of the field effect transistor to accumulate on the field effect transistor." For at least this reason, the combination of Dierickx, Nakamura, and Hynecek cannot render obvious the invention of claim 1. Claim 14 depends from nonobvious claim 1 and is therefore nonobvious for at least the same reasons.

As discussed above, the combination of Dierickx, Nakamura, and Hynecek fails to disclose or suggest a controller causing the accumulation of an electric charge indicative of the threshold voltage of a field effect transistor. Therefore, the combination of Dierickx, Nakamura, and Hynecek cannot render obvious the invention of claim 25 that includes such a limitation. As claim 29 depends from nonobvious claim 25, claim 29 is nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 14 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Dierickx in view of Nakamura and in further view of Hynecek, be reconsidered and withdrawn.

CONCLUSION

In view of the foregoing, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are respectfully requested.

This Response does not increase the number of independent claims, does not increase the total number of claims, and does not present any multiple dependency claims beyond the number of claims originally paid for. Accordingly, no fee based on the number or type of claims is currently due. If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed. Any fee required for such a Petition for Extension of Time or any other fee required by this response, including any fee pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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